



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 411 840 A3

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 90308260.0

(51) Int. Cl. 5: G01R 33/36, G01R 33/54

(22) Date of filing: 27.07.90

(30) Priority: 04.08.89 US 389456

(72) Inventor: Stormont, Robert Steven

21675 Cologne Road
Waukesha, Wisconsin 53186(US)

Inventor: Anas, Michael Charles
N105 W16452 Prairie Way

Germantown, Wisconsin 53022(US)

Inventor: Pelc, Norbert Joseph
1641 Mountain Avenue

Wauwatosa, Wisconsin 53213(US)

(43) Date of publication of application:
06.02.91 Bulletin 91/06

(74) Representative: Pratt, Richard Wilson et al
London Patent Operation G.E. TECHNICAL
SERVICES CO. INC. Burdett House 15/16
Buckingham Street
London WC2N 6DU(GB)

(64) Designated Contracting States:
CH DE FR GB LI NL

(58) Date of deferred publication of the search report:
03.07.91 Bulletin 91/27

(71) Applicant: GENERAL ELECTRIC COMPANY
1 River Road
Schenectady, NY 12345(US)

(54) Radio frequency receiver for a NMR instrument.

(57) A receiver processes an NMR signal to produce a baseband image information signal from which two quadrature component signals are derived. An intermediate frequency section mixes (303, 306) the received NMR signal with two reference signals (201, 204) to shift the image information into a frequency band having a bandwidth BW and centered at a frequency that is 1:5 times the bandwidth BW. The resultant signal is filtered (308) to remove extraneous signals outside the image information band. An ana-

log to digital converter (209) samples the filtered signal at a rate that is twice the bandwidth Bw and digitizes the samples into a digital signal. A quadrature detector (210) derives I and Q output signals from the digital signal by alternately selecting (311, 321) digital samples and negating every other sample selected for each of the I and Q output signals. The quadrature detector also digitally filters (312, 322) the I and Q signals which are then used to construct an NMR image.

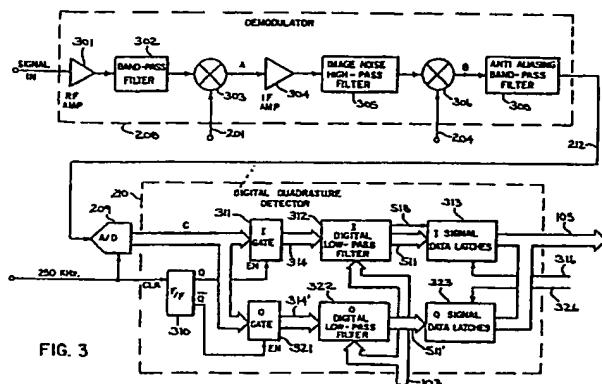


FIG. 3



European
Patent Office

EUROPEAN SEARCH
REPORT

Application Number

EP 90 30 8260

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)		
A	EP-A-0 307 989 (PHILIPS PATENTVERWALTUNG GmbH) * Column 2, line 18 - column 3, line 42; column 4, line 24 - column 6, line 56; figures 2,3 *	1,6,7,13	G 01 R 33/36 G 01 R 33/54		
A	EP-A-0 292 064 (N.V. PHILIPS GLOEILAMPEN-FABRIEKEN) * Column 2, line 41 - column 3, line 31; column 8, line 18 - column 9, line 26; figure 4 *	1,7,11-13			
P,A	EP-A-0 336 479 (PHILIPS PATENTVERWALTUNG GmbH) * Column 1, line 36 - column 3, line 16; column 4, line 4 - column 6, line 16; figures 2,3 *	1,2,5,7, 13,14,16			
A	JOURNAL OF PHYSICS E: SCIENTIFIC INSTRUMENTS, vol. 14, 1981, pages 1253-1256, Dorking, GB; F. MOMO et al.: "Microcomputer based phase sensitive detector" * Pages 1253-1255, chapters 1,2,3; figures 1-5 *	1-3,8, 13-15			
A	E. FUKUSHIMA et al.: "Experimental pulse NMR", 1981, pages 60-76, Addison-Wesley Publishing Co., Inc., Reading, US; chapter: "Quadrature detection" * Pages 60-64 *	1,7,13	TECHNICAL FIELDS SEARCHED (Int. Cl.5)		
			G 01 R		
The present search report has been drawn up for all claims					
Place of search	Date of completion of search	Examiner			
The Hague	04 April 91	VOLMER J.W.			
CATEGORY OF CITED DOCUMENTS					
X: particularly relevant if taken alone	E: earlier patent document, but published on, or after the filing date				
Y: particularly relevant if combined with another document of the same category	D: document cited in the application				
A: technological background	L: document cited for other reasons				
O: non-written disclosure				
P: Intermediate document	B: member of the same patent family, corresponding document				
T: theory or principle underlying the invention					